

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BOARD OF PATENT APPEALS AND INTERFERENCES

Applicants: Furong Zhu, Kian Soo Ong and Examiner: Hines, Anne M.
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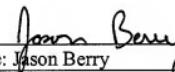
Title: FLEXIBLE ELECTROLUMINESCENT DEVICES

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APPELLANTS' REPLY BRIEF

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Sir:

This brief is in reply to the Examiner's Answer mailed August 3, 2010. Applicants have appealed to the Board from the decision of the Examiner in the Final Office Action mailed August 4, 2009, responsive to Applicant's Response filed on April 16, 2009, of the pending claims (1-19, 21, 23-25, 27, 28 and 30).

I. Rejection of claims 1, 9, 11, 28 and 30 under 35 U.S.C. § 103(a) over Winans in view of Grace

Appellants respectfully submit that there is no support in Winans for providing a reflective flexible substrate such that light generated as a result of electro-luminescence from the device is reflected back towards the upper electrode for enhancing the optical output from the light emitting device, as defined in the independent claims of the present invention. That is, there is no disclosure in Winans of configuring the “reflective metal foil” as positively recited in the independent claims of the present invention. More particularly, nowhere is there any suggestion of enhancing the light output in the first place, let alone that any such enhancement can be achieved by a specific configuration of a reflective flexible substrate as positively recited in the independent claims of the present invention. It is respectfully submitted that it is exactly this absence of any type of disclosure relating to manufacture and optimization of the light output from light emitting devices, which is the reason why Winans would not be consulted by a person skilled in the relevant art as a starting reference for addressing any problems associated with lack of performance, i.e. optimization of light output from light emitting devices, as is being addressed and overcome in the present invention.

Dealing more specifically with the claimed feature of enhancing light output from a light-emitting device by disposing a reflective flexible substrate such that light generated as a result of the photo electro-luminescence of the device is directed towards the upper electrode for enhancing light output, Winans states that “the cell 450 may emit light through the top layer ... or through the bottom layer ... or through the top and bottom.” See Winans at ¶ 0120. It is respectfully submitted that this disclosure unambiguously highlights to a person skilled in the art that Winans is limited to considering opaque top or bottom layers of the cell functioning as “shutters”, i.e. eliminating emission through the respective top or bottom of the cell, and in essence Winans simply discloses that either one or both of the shutters are “opened”.

In that regard, it is not simply a question of providing a reflective element in the light emitting device of the present invention, but that such reflective element must be specifically disposed so that enhancement of light output can be achieved, as is positively recited in the

independent claims of the present invention. That is, without a recognition of the solution of utilizing a reflective substrate to redirect light generated as a result of electro-luminescence towards a semi-transparent top electrode for the specific purpose of enhancing light output through the semi-transparent electrode, the "accidental" provision of any type of reflective element would not inherently result in the invention as claimed in the independent claims of the present invention. As will be appreciated by a person skilled in the art, a large number of parameters need to be considered in such a configuration. For example, phase changes experienced by the light being reflected are not inherently suitable for achieving an enhanced light output, but rather may deteriorate light output through destructive interference. As another example, the reflection of ambient light and its deteriorating effects on the contrast and thus overall output efficiency of the light emitting device need to be considered. Thus, an accidental provision of a reflective element would not inherently result in the effects as positively recited in the features of the independent claims of the present invention.

Moreover, Winans does not focus on the technology field of actual manufacture and design of light-emitting devices such as electro-luminescence elements or organic light-emitting diodes. Winans contains very limited disclosure of details on actual manufacture, let alone optimization, of light-emitting devices, if any. Rather, Winans is directed to the technology field of gaming design and interfacing of gaming information to user's of the gaming machine. In particular, Winans is primarily directed at a gaming interface for gaming machines, with the vast majority of the disclosure in Winans being directed towards the functional features of the gaming interface, such as its use for 1) a game of chance playing on the gaming machine, 2) player tracking services, 3) game services available on the gaming machine and 4) attract features.

It is respectfully submitted that it would be evident to a person skilled in the relevant art of the present invention, that is the actual manufacture and optimization of light emitting devices, that Winans would not be considered a source of disclosure for the actual manufacture of light-emitting devices, and including their optimization. Thus, it is respectfully submitted that the continued reliance on Winans as the main reference in an rejection under Section 103 is improper.

In view of the above Reply, and always in conjunction with the arguments provided in the Appeal Brief, it is respectfully submitted that the independent claims and their respective dependent claims are patentable over Winans in view of Grace.

II. Rejection of claims 1, 2-8, 12-13, 15 and 23-24 under 35 U.S.C. § 103(a) over Mishima in view of Grace

The Examiner has acknowledged that Mishima does not disclose, at least, the feature of providing the reflective flexible substrate such that light generated as a result of electroluminescence in the light emitting device is redirected towards the upper electrode for enhancing the light output of the device, as positively recited in the independent claims of the present invention. The disclosure in Mishima is concerned with provision of light emitting devices in which electroluminescence is utilized to provide, for example, a pixelised display.

Grace does not make up for the deficiencies of Mishima. As explained in detail in the Appeal Brief, the portions of Grace relied upon by the Examiner first and foremost do not disclose anything in relation to light emitting devices that incorporate an electroluminescence active region. Rather, those paragraphs are clearly limited to liquid crystal display (LCD) light emitting devices, which are simply not the same, and operate on an entirely different principle, as would be appreciated by a person skilled in the art. For that reason alone, we respectfully submit that reliance on any alleged teaching in Grace in support of the rejection under Section 103 cannot be maintained.

More particularly, at column 7, lines 3 to 11 of Grace, the disclosure of "a metal protective layer may also function as a reflective layer" must clearly be considered in the context of the preceding paragraphs, most importantly in column 6, lines 27 onwards. There it is clearly disclosed that the concept of "reflectivity" is referred to in the context of LCD technology, and, as is readily appreciated by a person skilled in the art, such reflectivity simply and plainly refers to reflection of ambient (sunlight) as a light source for the LCD, potentially aided by an additional light source incorporated into the LCD, with the LCD functioning by selective transmission/blocking of the reflected light by way of control of the liquid crystal properties. That is, Grace does not disclose light generated as a result of electroluminescence in the light

emitting device being redirected towards the upper electrode for enhancing the light output of the device, as positively recited in the independent claims of the present invention.

Additionally, we respectfully submit that a person skilled in the art would not consider the combination of Mishima and Grace for providing a reflective layer underneath a colorless and transparent anode in Mishima, since in the device in Mishima there is no need to provide for reflection of ambient light as in Grace, because Mishima is not concerned with LCD technology. Indeed, we respectfully submit that the two references teach away from each other and the person skilled in the art would have very strong reasons not to combine the disclosures in that way, since reflection of ambient light in a light emitting device based on electroluminescence would be believed to deteriorate the contrast of the light emitting device, and therefore would be a non-sensical, and thus non-obvious combination.

Moreover, even an “accidental” combination of Mishima and Grace, would nevertheless not inherently achieve the relevant features, in particular a reflected layer disposed such as to enable an enhancement of light output as positively recited in the independent claims of the present invention. As mentioned above in response to the objection under Section 103 in view of Winans as the main reference, consideration would have to be given to numerous parameters including phase changes of the reflected light generated from the electroluminescence which can lead to destructive interference, and the deteriorating effect based on reflected ambient light and associated contrast reduction.

In view of the above Reply, and in conjunction with the arguments provided in the Appeal Brief, it is respectfully submitted that the independent claims and their respective dependent claims are patentable over the cited references, since the acknowledged deficiencies in Mishima are not overcome by Grace.

Conclusion

In conclusion, it is respectfully submitted that the Appeal should be approved and the present application passed on to Allowance.

Respectfully submitted,

Date: October 4, 2010



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